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3,477,888

METHOD OF PRODUCING EXPLOSIVE WITH  
HIGH BRISANCE

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1 Claim

## ABSTRACT OF THE DISCLOSURE

This invention relates to a method of producing an explosive that has a high brisance. In order to increase the specific gravity of high explosives without the necessity of compression, one or more types of water soluble substances, such as sugar, glycerine, sodium chromate and the like are dissolved in water and a saturated solution is obtained.

By dissolving one or more types of natural or synthetic water-dispersible polymers such as starch, for example powdered potato starch derived from the konnyaku potato, carboxymethylcellulose and the like, in this solution, a non-evaporative and non-crystallizing binder with a minimum specific gravity of 1.45 is obtained.

By employing this binder and adding an appropriate amount to one type or a mixture of two or more types of high explosives and mixing, a specific gravity of 1.45 and over can be readily produced without compressing.

## BACKGROUND OF THE INVENTION

Heretofore high brisance and safety in handling were desired features of explosives. The brisance of an explosive has the greatest influence on its detonation velocity. Also the detonation velocity is proportionate to the explosive's density. Therefore, for military explosives and high velocity explosives requiring high brisance a high density becomes necessary and such methods as, compressing or melting of the powder, or mixing with wax or plastic which is then compressed and hardened, are employed. However in either process heating and high compression (400 kg./cm.<sup>2</sup>–700 kg./cm.<sup>2</sup>) become necessary resulting in danger of accidental explosion, and complicating the process.

## SUMMARY OF THE INVENTION

The explosives of the present invention can attain a high density (1.5 g./cm.<sup>3</sup> and over) without being subjected to these heating and compression steps.

Heretofore it has been experimentally known that when an appropriate amount of liquid is contained within an explosive its detonation velocity is increased. However in actual usage there has been no example wherein this principle has been employed with an objective of heightening the brisance of a high explosive, except for cases where a small amount of water has been added to mining and industrial explosives to attain safety.

DESCRIPTION OF THE PREFERRED  
EMBODIMENT

Under this invention in order to heighten the explosion brisance of a single type or a mixture of 2 or more types of high explosives, such as cyclotrimethylene trinitramine (hereinafter called RDX), pentaerythritol tetranitrate (hereinafter called PETN), trinitrophenylmethyl nitra-

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mine (hereinafter called tetryl), and trinitrotoluene (hereinafter called TNT) a saturated solution is prepared by dissolving a water soluble inorganic salt such as sodium chromate, sodium sulphate, sodium nitrate, sodium perchlorate, lithium chromate or ammonium nitrate or one or more types of water soluble organic substances such as sugar or glycerine in water, and in this saturated solution 2–5% of one or more types of natural or synthetic gums such as starch or carboxymethylcellulose is dissolved.

The resulting product is a gel-like material which is non-evaporative and non-crystallizing and has a specific gravity of 1.45 or more. By employing this as a binder and adding an appropriate amount (e.g., 10–30%) to an explosive and mixing at normal temperature a plastic explosive is obtained. In other words this is a method of manufacturing an explosive that will readily attain a high density of 1.50 and over without compression thus enabling the generation of high brisance quite readily.

## Example

To 100 milliliters of water 200 grams of sodium nitrate and 10 grams of sugar are added, and by further dissolving 5 grams of potato starch powder derived from the konnyaku potato, in this solution a gel-like, high viscosity, non-evaporative, non-crystallizing binder is obtained.

By adding 20% by weight of this binder to a high explosive such as RDX, PETN, tetryl, TNT, or the like, and mixing, an explosive of plastic nature of a high specific gravity is obtained.

CAPACITY TABLE

Name of explosive	Binder, percent	Specific gravity (g./cm. <sup>3</sup> )	Detonation velocity (m./sec.)	Explosion charge diameter (mm.)
35 RDX.....	20	1.67–1.70	8,500–8,800	10
Tetryl.....	20	1.62–1.65	7,600–8,800	10
TNT (10).....	20	1.50	7,500	10
PETN.....	20	1.64	8,000	10

## I claim:

1. A method of producing an explosive composition that is capable of generating high brisance, comprising the steps of preparing a substantially saturated solution of at least one water-soluble substance of the class consisting of water-soluble inorganic oxidizer salts, sugar and glycerine; incorporating in said solution at least one water-dispersible polymer of the class consisting of starch and carboxymethylcellulose, in an amount sufficient to produce a non-evaporative, non-crystallizing binder having a specific gravity of at least 1.45; and then mixing, without compressing, at least one organic explosive of the class consisting of cyclotrimethylene trinitramine, pentaerythritol tetranitrate, trinitrophenylmethyl nitramine, and trinitrotoluene with said binder, said binder comprising 10 to 30% by weight of said organic explosive.

## References Cited

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